A framework for estimating elk abundance in Arizona

The Arizona Game and Fish Department is tasked with managing the state's elk population for current and future generations. In order to make decisions regarding elk management and to set appropriate harvest limits, the Department has used different approaches over the years to obtain population trend estimates. In the past, these trend estimates have proven useful and effective for harvest management because precise density estimates were deemed unnecessary. Recent management concerns, however, such as those related to elk browsing impacts on aspen regeneration, potential changes to elk carrying capacity following large fires, or predator-prey relationships, have demonstrated the need for more precise density estimates of Arizona elk populations.

In order to inform the decisions of the Department and facilitate effective resource allocation, this project seeks to develop a framework for estimating elk abundance in Arizona. We will do this by comparing and quantifying the accuracy, precision, and needed resources associated with some of the most common wildlife data collection approaches and estimation methods.

Objectives

1. Provide a literature review and evaluation of potential survey methods for estimating elk abundance in Arizona.
2. Conduct an empirical comparison of the accuracy and precision of a subset of candidate methods for estimating elk abundance in Arizona, including abundance estimates obtained from a concurrent mark-recapture survey.
3. Present recommended and alternate survey methods to estimate elk abundance in Arizona with a focus on:
    a. Resulting accuracy and precision of abundance estimates in a variety of habitat types; and
    b. Resource needs (costs) to conduct and analyze survey results.

Approach

We will trap and collar elk to deploy VHF and GPS collars so we have a known set of marked animals to evaluate different survey methods. We will then use aerial survey techniques to test several approaches including, but not limited to, mark-recapture methods, simultaneous double-counts, and sightability models.

Location

This project will be conducted in Units 1 and 3C in Region 1 and in Unit 7E in Region 2. These specific units were selected based on elk density, historic survey effort, and because they represented the range of habitats in which the majority of Arizona's elk occur.

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